

# High Resolution, High Sensitivity LIDAR for Robotic Space Operation Support, Phase I

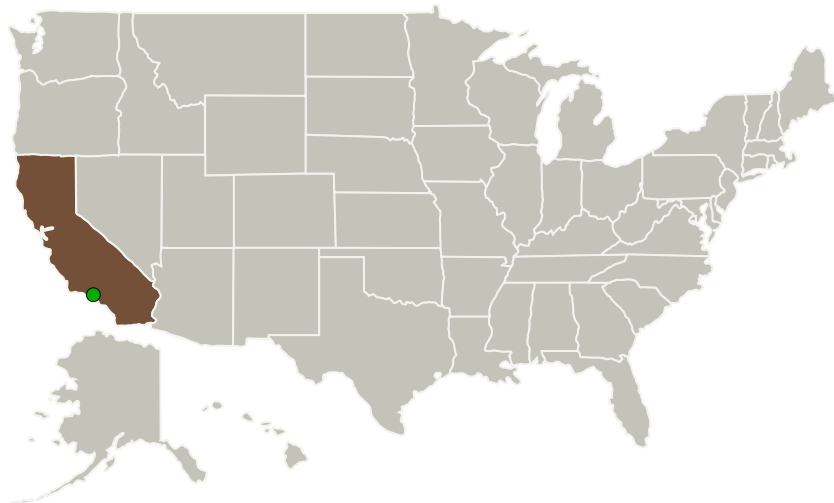
Completed Technology Project (2015 - 2015)



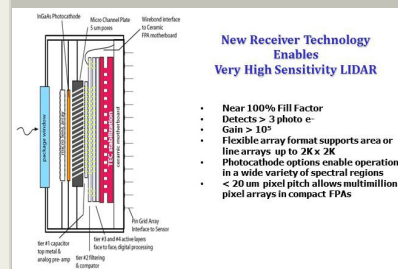
## Project Introduction

Design of an advanced 3D LIDAR Receiver is proposed which enables low SWaP LIDAR systems with significantly increased numbers of detectors allowing 3D imagery to be obtained over large areas, with high resolution (cm), high sensitivity (near single photon counting capability), high dynamic range ( $10^5$ ) and high sample rates (GHz) when operated with high pulse rate fiber lasers. These characteristics enable accurate robotic operations under conditions of uncertainty. Operating in SWIR will permit LIDAR operation without inducing noise effects in Vis/VNIR passive sensors which may be operating simultaneously and near the LIDAR. The technical approach will support a wide ,UV to MWIR, spectrum of operating wavelengths by change out of photocathode and optimization of the subsequent amplification and readout parameters.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Irvine Sensors Corporation	Lead Organization	Industry	Costa Mesa, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



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## Primary U.S. Work Locations

California

## Project Transitions

**June 2015:** Project Start

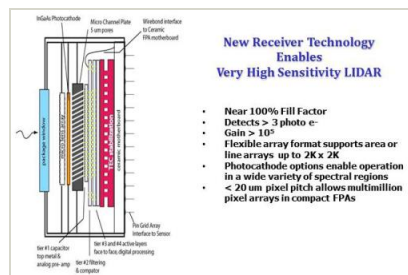
**December 2015:** Closed out

**Closeout Summary:** High Resolution, High Sensitivity LIDAR for Robotic Space Operation Support, Phase I Project Image

### Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139064>)

## Images



### Briefing Chart Image

High Resolution, High Sensitivity LIDAR for Robotic Space Operation Support, Phase I  
(<https://techport.nasa.gov/image/129649>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Irvine Sensors Corporation

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

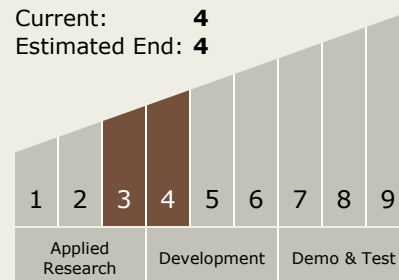
Carlos Torrez

### Principal Investigator:

Medhat T Azzazy

## Technology Maturity (TRL)

Start: **3**  
Current: **4**  
Estimated End: **4**



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## Technology Areas

### Primary:

- TX04 Robotic Systems
  - └ TX04.1 Sensing and Perception
    - └ TX04.1.2 State Estimation

## Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System